

WHAT IS CLAIMED IS:

1. A radio apparatus, including:

a processing unit which performs an adaptive array processing on signals to be transmitted to a predetermined terminal apparatus; and

a transmitter which transmits to the terminal apparatus the signals processed by said processing unit, wherein said processing unit controls transmission power in such a manner that received power at the terminal apparatus is kept approximately constant.

2. A radio apparatus, including:

a receiver which receives signals from a predetermined terminal apparatus;

a received response characteristics computing unit which calculates, from the signals received by said receiver, a received response characteristic for the terminal apparatus;

a transmission weight factor computing unit which computes, from the signals received by said receiver, a candidate of transmission weight factor for the terminal apparatus;

a predicted power computing unit which computes, from the candidate of transmission weight factor and the received response characteristic, a predicted receiving power value

in the terminal apparatus;

a storage which stores the predicted receiving power value computed by said predicted power computing unit;

a setting unit which updates and sets the transmission weight factor to the candidate of transmission weight factor computed by said transmission weight factor computing unit if a difference between a predicted receiving power value in the past stored in said storage and the predicted receiving power value computed by said predicted power computing unit is less than a predetermined threshold value and which sets without updating the transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value; and

a transmitter which transmits signals to the terminal apparatus based on the transmission weight factor set by said setting unit.

3. A radio apparatus, including:

a receiver which receives signals from a predetermined terminal apparatus;

a received response characteristics computing unit which calculates, from the signals received by said receiver, a received response characteristic for the terminal apparatus;

a transmission weight factor computing unit which computes, from the signals received by said receiver, a

candidate of transmission weight factor for the terminal apparatus;

a correction unit which corrects the candidate of transmission weight factor in a manner such that a relationship between the candidate of transmission weight factor and the received response characteristic comes close to a predetermined value in a prescribed range of values;

a predicted power computing unit which computes, from the corrected candidate of transmission weight factor and the received response characteristic, a predicted receiving power value in the terminal apparatus;

a storage which stores the predicted receiving power value computed by said predicted power computing unit;

a setting unit which updates and sets the transmission weight factor with the corrected candidate of transmission weight factor computed by said transmission weight factor computing unit if a difference between a predicted receiving power value in the past stored in said storage and the predicted receiving power value computed by said predicted power computing unit is less than a predetermined threshold value and which sets without updating the transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value; and

a transmitter which transmits signals to the terminal apparatus based on the transmission weight factor set by said setting unit.

4. A radio apparatus according to Claim 2, wherein, if the transmission weight factor is set, without having been updated, for longer than a predetermined period of time, said setting unit updates the transmission weight factor irrespective of the difference between the predicted receiving power value in the past stored in said storage and the thus computed predicted receiving power value.

5. A radio apparatus according to Claim 3, wherein, if the transmission weight factor is set, without having been updated, for longer than a predetermined period of time, said setting unit updates the transmission weight factor irrespective of the difference between the predicted receiving power value in the past stored in said storage and the thus computed predicted receiving power value.

6. A radio apparatus, including:

- a receiver which receives signals from a predetermined terminal apparatus;

- a received response characteristics computing unit which calculates, from the signals received by said receiver, a received response characteristic for the terminal apparatus;

- a transmission weight factor computing unit which computes, from the signals received by said receiver, a

first candidate of transmission weight factor for the terminal apparatus;

a correction unit which corrects the first candidate of transmission weight factor in a manner such that a relationship between the first candidate of transmission weight factor and the received response characteristic comes close to a predetermined value in a prescribed range of values;

a predicted power computing unit which computes, from the corrected first candidate of transmission weight factor and the received response characteristic, a predicted receiving power value in the terminal apparatus;

a storage which stores the predicted receiving power value computed by said predicted power computing unit;

a setting unit which sets the transmission weight factor to the corrected first candidate of transmission weight factor by updating a second candidate of transmission weight factor if a difference between a predicted receiving power value in the past stored in said storage and the predicted receiving power value computed by said predicted power computing unit is less than a predetermined threshold value and which sets without updating the second candidate of transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value;

an information input unit which inputs information to signals to be transmitted;

a setting unit which sets, based on the information inputted to signals to be transmitted, either the first candidate of transmission weight factor or the second candidate of transmission weight factor as a transmission weight factor; and

a transmitter which transmits signals to the terminal apparatus based on the transmission weight factor set by said setting unit.

7. A radio apparatus according to Claim 6, wherein, if the transmission weight factor is set, without the second candidate of transmission weight factor having been updated, for longer than a predetermined period of time, said setting unit sets by updating the second candidate of transmission weight factor irrespective of the difference between the predicted receiving power value in the past stored in said storage and the thus computed predicted receiving power value.

8. A radio apparatus according to Claim 6, wherein as the information inputted to signals to be transmitted said information input unit inputs information indicative of whether or not predetermined information is contained in an amplitude component of a signal to be transmitted, and wherein said setting unit sets the first candidate of transmission weight factor as the transmission weight factor

if the predetermined information is not contained in the amplitude component of a signal to be transmitted, whereas said setting unit sets the second candidate of transmission weight factor as the transmission weight factor if the predetermined information is contained in the amplitude component of the signal to be transmitted.

9. A radio apparatus according to Claim 6, further including a measuring unit which measures the magnitude of variation in power of the received signals during a predetermined period,

wherein as the information inputted to signals to be transmitted said information input unit inputs the magnitude of variation in power, and

wherein said setting unit sets the first candidate of transmission weight factor as the transmission weight factor if the magnitude of variation in power is less than a predetermined threshold value, whereas said setting unit sets the second candidate of transmission weight factor as the transmission weight factor if the magnitude of variation in power is greater than or equal to the predetermined threshold value.

10. A radio apparatus according to Claim 6, further including a measuring unit which measures a power value of the received signal,

wherein as the information inputted to signals to be transmitted said information input unit inputs the power value, and

wherein said setting unit sets the first candidate of transmission weight factor as the transmission weight factor if the power value is less than a predetermined threshold value, whereas said setting unit sets the second candidate of transmission weight factor as the transmission weight factor if the power value is greater than or equal to the predetermined threshold value.

11. A radio apparatus according to Claim 6, further including a measuring unit which measures a power ratio of a power value of the signal received from the terminal apparatus to that of signals received from other terminal apparatus,

wherein as the information inputted to signals to be transmitted said information input unit inputs the power ratio, and

wherein said setting unit sets the first candidate of transmission weight factor as the transmission weight factor if the power ratio is less than a predetermined threshold value, whereas said setting unit sets the second candidate of transmission weight factor as the transmission weight factor if the power ratio is greater than or equal to the predetermined threshold value.

12. A radio apparatus, including:

a receiver which receives signals from a terminal apparatus via a plurality of antennas;

a measuring unit which measures the magnitude of variation in power of the received signals;

a transmission weight factor computing unit which computes, from the received signals, a transmission weight factor for the terminal apparatus; and

a transmitter which transmits signals, based on the transmission weight factor computed by said transmission weight factor computing unit, via the plurality of antennas if the magnitude of variation in power measured by said measuring unit is less than a predetermined threshold value and which transmits signals via one of the plurality of antennas if the magnitude of variation in power measured by said measuring unit is greater than or equal to a predetermined threshold value.

13. A transmission method which controls transmission power in such a manner that reception power received at a predetermined terminal apparatus remains approximately constant when an adaptive array processing is performed on signals to be transmitted to the terminal apparatus.

14. A transmission method which computes, based on a

received signal from a radio apparatus which is a targeted communication party, a transmission weight factor for the radio apparatus, estimates the magnitude of variation in reception power of the radio apparatus from the received signal and the computed transmission weight factor and which transmits signals to the radio apparatus with the computed transmission weight factor if the magnitude of variation in the reception power is less than a predetermined threshold value and transmits signals to the radio apparatus with a transmission weight factor that has been used so far if the magnitude of variation in the reception power is greater than or equal to the predetermined threshold value.

15. A transmission method, including:

receiving signals from a predetermined terminal apparatus;

calculating from the received signals a received response characteristic for the terminal apparatus;

computing from the received signals a candidate of transmission weight factor for the terminal apparatus;

computing, from the candidate of transmission weight factor and the received response characteristic, a predicted receiving power value in the terminal apparatus;

storing the computed predicted receiving power value in a storage;

setting by updating the transmission weight factor

with the computed candidate of transmission weight factor if a difference between a predicted receiving power value in the past stored in the storage and the predicted receiving power value computed by said computing a predicted receiving power value is less than a predetermined threshold value, and setting without updating the transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value; and

transmitting signals to the terminal apparatus based on the transmission weight factor set by said setting.

16. A transmission method, including:

receiving signals from a predetermined terminal apparatus;

calculating from the received signals a received response characteristic for the terminal apparatus;

computing from the received signals a candidate of transmission weight factor for the terminal apparatus;

correcting the candidate of transmission weight factor in a manner such that a relationship between the candidate of transmission weight factor and the received response characteristic comes close to a predetermined value in a prescribed range of values;

computing, from the corrected candidate of transmission weight factor and the received response characteristic, a predicted receiving power value in the

terminal apparatus;

storing the computed predicted receiving power value in a storage;

setting by updating the transmission weight factor with the corrected candidate of transmission weight factor if a difference between a predicted receiving power value in the past stored in the storage and the predicted receiving power value computed by said computing a predicted receiving power value is less than a predetermined threshold value, and setting without updating the transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value; and

transmitting signals to the terminal apparatus based on the transmission weight factor set by said setting.

17. A transmission method according to Claim 15, wherein, if the transmission weight factor is set, without having been updated, for longer than a predetermined period of time, said setting is such that the transmission weight factor is updated irrespective of the difference between the predicted receiving power value in the past stored in the storage and the thus computed predicted receiving power value.

18. A transmission method according to Claim 16, wherein, if the transmission weight factor is set, without having been updated, for longer than a predetermined period of time,

said setting is such that the transmission weight factor is updated irrespective of the difference between the predicted receiving power value in the past stored in the storage and the thus computed predicted receiving power value.

19. A transmission method, including:

- receiving signals from a predetermined terminal apparatus;

- calculating from the received signals a received response characteristic for the terminal apparatus;

- computing from the received signals a first candidate of transmission weight factor for the terminal apparatus;

- correcting the first candidate of transmission weight factor in a manner such that a relationship between the first candidate of transmission weight factor and the received response characteristic comes close to a predetermined value in a prescribed range of values;

- computing, from the corrected first candidate of transmission weight factor and the received response characteristic, a predicted receiving power value in the terminal apparatus;

- storing the computed predicted receiving power value in a storage;

- setting by updating a second candidate of transmission weight factor with the corrected first candidate of transmission weight factor by the second candidate of

transmission weight factor if a difference between a predicted receiving power value in the past stored in the storage and the predicted receiving power value computed by said computing predicted receiving power value is less than a predetermined threshold value, and setting without updating the second candidate of transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value;

inputting information to signals to be transmitted;

setting, based on the information inputted signals to be transmitted, either the first candidate of transmission weight factor or the second candidate of transmission weight factor as a transmission weight factor; and

transmitting signals to the terminal apparatus based on the transmission weight factor set by said setting.

20. A transmission method according to Claim 19, wherein, if the transmission weight factor is set, without the second candidate of transmission weight factor having been updated, for longer than a predetermined period of time, said setting by or without updating is such that said setting is done by updating the second candidate of transmission weight factor irrespective of the difference between the predicted receiving power value in the past stored in the storage and the thus computed predicted receiving power value.

21. A transmission method according to Claim 19, wherein as the information inputted to signals to be transmitted said inputting inputs information indicative of whether or not predetermined information is contained in an amplitude component of a signal to be transmitted, and wherein said setting sets the first candidate of transmission weight factor as the transmission weight factor if the predetermined information is not contained in the amplitude component of the signal to be transmitted, whereas said setting sets the second candidate of transmission weight factor as the transmission weight factor if the predetermined information is contained in the amplitude component of a signal to be transmitted.

22. A transmission method according to Claim 19, further including measuring the magnitude of variation in power of the received signals during a predetermined period,

wherein as the information inputted to signals to be transmitted said inputting information inputs the magnitude of variation in power, and

wherein said setting sets the first candidate of transmission weight factor as the transmission weight factor if the magnitude of variation in power is less than a predetermined threshold value, whereas said setting sets the second candidate of transmission weight factor as the transmission weight factor if the magnitude of variation in

power is greater than or equal to the predetermined threshold value.

23. A transmission method according to Claim 19, further including measuring a power value of the received signal,

wherein as the information inputted to signals to be transmitted said inputting information inputs the power value, and

wherein said setting sets the first candidate of transmission weight factor as the transmission weight factor if the power value is less than a predetermined threshold value, whereas said setting sets the second candidate of transmission weight factor as the transmission weight factor if the power value is greater than or equal to the predetermined threshold value.

24. A transmission method according to Claim 19, further including measuring a power ratio of a power value of the signal received from the terminal apparatus to that of signals received from other terminal apparatus,

wherein as the information inputted to signals to be transmitted said inputting information inputs the power ratio, and

wherein said setting sets the first candidate of transmission weight factor as the transmission weight factor if the power ratio is less than a predetermined threshold

value, whereas said setting sets the second candidate of transmission weight factor as the transmission weight factor if the power ratio is greater than or equal to the predetermined threshold value.

25. A transmission method, including:

receiving signals from a terminal apparatus via a plurality of antennas;

measuring the magnitude of variation in power of the received signals;

computing from the received signals a transmission weight factor for the terminal apparatus; and

transmitting signals, based on the transmission weight factor computed by said computing, via the plurality of antennas if the magnitude of variation in power measured by said measuring is less than a predetermined threshold value, and transmitting signals via one of the plurality of antennas if the magnitude of variation in power measured by said measuring is greater than or equal to the predetermined threshold value.

26. A program executable by a computer, the program including the functions of:

receiving signals in a memory from a predetermined terminal apparatus;

calculating, from the signals received in the memory,

a received response characteristic for the terminal apparatus;

computing, from the signals received in a memory, a candidate of transmission weight factor for the terminal apparatus;

computing, from the candidate of transmission weight factor and the received response characteristic, a predicted receiving power value in the terminal apparatus;

storing the computed predicted receiving power value in a recording device;

setting by updating a memory of the transmission weight factor with the computed candidate of transmission weight factor if a difference between a predicted receiving power value in the past stored in the recording device and the predicted receiving power value computed by said computing a predicted receiving power value is less than a predetermined threshold value, and setting without updating the memory of the transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value; and

transmitting signals to the terminal apparatus based on the memory of the transmission weight factor set by said setting.

27. A program executable by a computer, the program including the functions of:

receiving signals in a memory from a predetermined terminal apparatus;

calculating, from the signals received in the memory, a received response characteristic for the terminal apparatus;

computing, from the signals received in the memory, a candidate of transmission weight factor for the terminal apparatus;

correcting the candidate of transmission weight factor in a manner such that a relationship between the candidate of transmission weight factor and the received response characteristic comes close to a predetermined value in a prescribed range of values;

computing, from the corrected candidate of transmission weight factor and the received response characteristic, a predicted receiving power value in the terminal apparatus;

storing the computed predicted receiving power value in a storage;

setting by updating a memory of the transmission weight factor with the corrected candidate of transmission weight factor if a difference between a predicted receiving power value in the past stored in the storage and the predicted receiving power value computed by said computing a predicted receiving power value is less than a predetermined threshold value, and setting without updating the memory of

the transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value; and

transmitting signals to the terminal apparatus based on the memory of the transmission weight factor set by said setting.

28. A program according to Claim 26, wherein, if the transmission weight factor is set, without having been updated, for longer than a predetermined period of time, the setting is such that the transmission weight factor is updated irrespective of the difference between the predicted receiving power value in the past stored in the storage and the thus computed predicted receiving power value.

29. A program according to Claim 27, wherein, if the transmission weight factor is set, without having been updated, for longer than a predetermined period of time, the setting is such that the transmission weight factor is updated irrespective of the difference between the predicted receiving power value in the past stored in the storage and the thus computed predicted receiving power value.

30. A program executable by a computer, the program including the functions of:

receiving signals in a memory from a predetermined

terminal apparatus;

calculating, from the signals received in the memory, a received response characteristic for the terminal apparatus;

computing, from the signals received in the memory, a first candidate of transmission weight factor for the terminal apparatus;

correcting the first candidate of transmission weight factor in a manner such that a relationship between the first candidate of transmission weight factor and the received response characteristic comes close to a predetermined value in a prescribed range of values;

computing, from the corrected first candidate of transmission weight factor and the received response characteristic, a predicted receiving power value in the terminal apparatus;

storing the computed predicted receiving power value in a storage;

setting by updating a memory of a second candidate of transmission weight factor with the corrected first candidate of transmission weight factor if a difference between a predicted receiving power value in the past stored in the storage and the predicted receiving power value computed by said computing predicted receiving power value is less than a predetermined threshold value, and setting without updating the memory of the second candidate of

transmission weight factor if the difference thereof is greater than or equal to the predetermined threshold value;

inputting information to signals to be transmitted;

setting, based on the information inputted signals to be transmitted, either the first candidate of transmission weight factor or the second candidate of transmission weight factor to a memory of the transmission weight factor; and

transmitting signals to the terminal apparatus based on the memory of the transmission weight factor set by the setting.

31. A program according to Claim 30, wherein, if the transmission weight factor is set, without the memory of the second candidate of transmission weight factor having been updated, for longer than a predetermined period of time, the setting by updating or not updating the memory of the second candidate of transmission weight factor is such that the setting is done by updating the memory of the second candidate of transmission weight factor irrespective of the difference between the predicted receiving power value in the past stored in the storage and the thus computed predicted receiving power value.

32. A program according to Claim 30, wherein as the information inputted to signals to be transmitted the inputting inputs, to a memory, information indicative of

whether or not predetermined information is contained in an amplitude component of a signal to be transmitted, and wherein the setting sets the first candidate of transmission weight factor as the transmission weight factor if the predetermined information is not contained in the amplitude component of the signal, to be transmitted, inputted to the memory, whereas the setting sets the second candidate of transmission weight factor to the memory of the transmission weight factor if the predetermined information is contained in the amplitude component of the signal, to be transmitted, inputted to the memory.

33. A program according to Claim 30, further including measuring the magnitude of variation in power of the received signals during a predetermined period,

wherein as the information inputted to signals to be transmitted the inputting information inputs, to a memory, the magnitude of variation in power, and

wherein the setting sets the first candidate of transmission weight factor to the memory of the transmission weight factor if the magnitude of variation in power inputted to the memory is less than a predetermined threshold value, whereas the setting sets the second candidate of transmission weight factor to the memory of the transmission weight factor if the magnitude of variation in power inputted to the memory is greater than or equal to the

predetermined threshold value.

34. A program according to Claim 30, further including measuring a power value of the received signal,

wherein as the information inputted to signals to be transmitted the inputting information inputs the power value to a memory, and

wherein the setting sets the first candidate of transmission weight factor to the memory of the transmission weight factor if the power value inputted to the memory is less than a predetermined threshold value, whereas the setting sets the second candidate of transmission weight factor to the memory of the transmission weight factor if the power value inputted to the memory is greater than or equal to the predetermined threshold value.

35. A program according to Claim 30, further including measuring a power ratio of a power value of the signal received from the terminal apparatus to that of signals received from other terminal apparatus,

wherein as the information inputted to signals to be transmitted the inputting information inputs the power ratio to a memory, and

wherein the setting sets the first candidate of transmission weight factor to the memory of the transmission weight factor if the power ratio inputted to the memory is

less than a predetermined threshold value, whereas said setting sets the second candidate of transmission weight factor to the memory of the transmission weight factor if the power ratio inputted to the memory is greater than or equal to the predetermined threshold value.

36. A program executable by a computer, the program including the functions of:

receiving signals in a memory from a terminal apparatus via a plurality of antennas;

measuring the magnitude of variation in power of the signals received in the memory;

computing, from the signals received in the memory, a transmission weight factor for the terminal apparatus; and

transmitting signals, based on the computed transmission weight factor, via the plurality of antennas if the magnitude of variation in power measured by the measuring is less than a predetermined threshold value, and transmitting signals via one of the plurality of antennas if the magnitude of variation in power measured by the measuring is greater than or equal to the predetermined threshold value.